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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/734,704	12/12/2003	Fred C. Redeker	LAM2P461	2329

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EXAMINER

EDWARDS, LAURA ESTELLE

ART UNIT	PAPER NUMBER
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1734

DATE MAILED: 05/23/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/734,704

Applicant(s)

REDEKER ET AL.

Examiner

Laura Edwards

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 March 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 and 21-27 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9 and 21-27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-8 and 22-24 are rejected under 35 U.S.C. 102(e) as being anticipated by Montierth et al (US 2005/0003737).

Montierth et al teach an apparatus for planarizing a wafer comprising a tank having a lid thereon (see Fig. 1, 38) defined by a bottom and an enclosing wall, the tank being configured to contain an electrochemical solution; a wafer support structure (3802a) disposed within the tank, the wafer support structure being configured to support a wafer at a submerged position within the electrochemical solution to be contained within the tank; a planar member (3802b) disposed above and substantially parallel to the wafer support capable of being positioned proximate the wafer supported by the wafer support such that the planar member provides an upper confinement boundary for material deposited on the wafer through the electrochemical reaction, and a radiant energy source (3804; microwaves [0482-0483] and [0490]) disposed above the planar member and above the wafer support, the radiant energy source being oriented to direct the radiant energy through the planar member and to the wafer supported by the support structure.

With respect to backing member, see element (3804).

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With respect to the use of reflecting surfaces, see the abstract and various embodiments teaching reflecting surfaces to enhance reflection of the radiant energy in the tank (i.e., [0027], [0178], and so forth.

Claim Rejections - 35 USC § 102/103

The text of those sections of Title 35, U.S.C. 103 Code not included in this action can be found in a prior Office action.

Claims 1-7, 22, and 24 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Sandaiji et al (US 4,982,065).

Sandaiji et al disclose an apparatus for electrochemically treating a substrate comprising a tank (2), the tank being configured to contain an electrochemical solution; a wafer support structure (3) disposed within the tank, the wafer support structure being configured to support a wafer at a submerged position within the electrochemical solution to be contained within the tank; a planar member (7, see col. 8, line 14) disposed above and substantially parallel to the wafer support being positionable proximate the wafer supported by the wafer support via use of a micrometer (6) such that the planar member provides an upper confinement boundary for material deposited on the wafer through the electrochemical reaction, and a radiant energy source (8) disposed above the planar member and above the wafer support, the radiant energy source being oriented to direct the radiant energy through the planar member and to the wafer supported by the support structure. Even though Sandaiji et al are silent concerning the use of the apparatus for planarization of the wafer, it would have been inherent and in the alternative obvious that the apparatus of Sandaiji et al would be used for electrochemical planarization of

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the wafer because the apparatus of Sandaiji et al is equivalent in structure to the instantly claimed invention. Moreover, even though the instantly claimed invention recognizes the use of tank configured to contain an electroless plating solution, the presently claimed invention does not require a bath/pool/tank of electroless plating solution such that the electroless plating solution has been read as material intended to be used in the apparatus and not a structural limitation.

With respect to a backing member, see lens system (10).

Claim Rejections - 35 USC § 103

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Montierth et al (US 2005/0003737) in view of Mayer et al (US 5,096,550).

The teachings of Montierth et al have been mentioned above but Montierth et al are silent concerning the use of an in-tank heat exchanger. However, it was known in the art, at the time the invention was made, to provide an in-tank heat exchanger in order to control the electrochemical processing of the workpiece by maintaining the electrochemical processing solution at a desired temperature as evidenced by Mayer et al (see col. 5, lines 60 to col. 6, lines 1-3). It would have been obvious to one of ordinary skill in the art to provide a heat exchanger as taught by Mayer et al in the tank of Montierth et al in order to control the electrochemical processing of the wafer via maintaining the electrochemical processing solution at a desired temperature.

Claims 21 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Montierth et al (US 2005/0003737).

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The teachings of Montierth et al have been mentioned above but Montierth et al are silent concerning the planar member being positionable within 3 micrometers of the top of the supported wafer. However, because Montierth illustrates in various embodiments the work support being of varying thickness (see Fig. 1a versus Fig. 38) so as to be positionable closer to the energy source to enhance the intensity of the radiant energy released therefrom, it would have been obvious to one of ordinary skill in the art to determine via routine experimentation, the appropriate distance in micrometers of which to arrange the planar member relative to the wafer via controlling the positioning of the work support relative the energy source in order to control the intensity of radiant energy release on the wafer during electrochemical processing.

With respect to claim 25, Montierth et al recognize the use of a pressure differential to aid in the electrochemical processing/planarizing of the surface of the wafer to remove gas bubbles generated in the tank [0322]. It would have been within the purview of one skilled in the art to provide structure to effect a pressure differential to the surface of the planar member facing the supported wafer in order to aid in the electrochemical processing/planarizing of the surface of the wafer in removing gas bubbles.

Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Montierth et al (US 2005/0003737) as applied to claim 25 above, and further in view of Barringer et al (US 6,496,001).

The teachings of Montierth et al have been mentioned above but Montierth et al are silent concerning the use of a pressure differential structure/member including a distribution of materials having varying spring constants for applying the differential pressure distribution

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through the planar member. However, it was known in the planarization art, at the time the invention was made, to provide a pressure differential structure/member having varying spring constants for applying the differential pressure distribution through an adjacent planar member as evidenced by Barringer et al (see claims 5-8). In light of the teachings of Montierth et al to utilize a pressure differential in the removal of gas bubbles in the electrochemical processing/planarization apparatus, it would have been within the purview of one skilled in the art to provide a pressure differential structure/member having varying spring constants as taught by Barringer et al, in the apparatus of Montierth et al, for applying the differential pressure distribution through the adjacent planar member.

Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Montierth et al (US 2005/0003737) as applied to claim 25 above, and further in view of Zuniga et al (US 2004/0192173).

The teachings of Montierth et al have been mentioned above but Montierth et al are silent concerning the use of a pressure differential structure/member including a number of fluid filled chambers for applying differential pressure distribution through the planar member. However, it was known in the planarization art, at the time the invention was made, to provide a pressure differential structure/member having a number of fluid filled chambers for applying the differential pressure distribution through an adjacent planar member as evidenced by Zuniga et al (see [0008-0009]). In light of the teachings of Montierth et al to utilize a pressure differential in the removal of gas bubbles in the electrochemical processing/planarization apparatus, it would have been within the purview of one skilled in the art to provide a pressure differential

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structure/member having a number of fluid filled chambers as taught by Zuniga et al, in the apparatus of Montierth et al, for applying the differential pressure distribution through the adjacent planar member.

Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sandaiji et al (US 4,982,065) in view of Ballantine et al (US 6,699,400).

The teachings of Sandaiji et al have been mentioned above but Sandaiji et al are silent concerning an inlet and outlet for the solution. However, it was known in the art, at the time the invention was made, to provide an inlet and outlet for introducing and removing solution from a coating tank as evidenced by Ballantine et al (see col. 3, lines 2-10). In light of the teachings of Ballantine et al, it would have been obvious to one of ordinary skill in the art to provide a tank inlet and a tank outlet for the coating solution in order to enable introduction of the solution and removal of the solution to eliminate the need of the user to manually introduce and remove the solution.

With respect to the use of an in-tank heat exchanger, even though Sandaiji et al are silent concerning an in-tank heater, Ballantine et al recognize the use of a heating filament in tank to maintain the coating solution of a desired temperature (see col. 2, lines 56-59). It would have been obvious to one of ordinary skill in the art to provide a heating filament as taught by Ballantine et al in the tank of Sandaiji et al in order to maintain the etchant coating solution as a desired temperature.

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Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sandaiji et al (US 4,982,065).

The teachings of Sandaiji et al have been mentioned above but Sandaiji et al are silent the degree to which the planar member is positionable (i.e., within 3 micrometers) of the top of the supported wafer. However, because Sandaiji et al provide a micrometer (6) to move the planar member relative to the supported wafer in a distance of predetermined micrometers, it would have been obvious to one of ordinary skill in the art to determine via routine experimentation, the appropriate distance in micrometers of which to arrange the planar member relative to the wafer so as to provide the desired treatment to the wafer surface in so long as the wafer was not crushed or damaged.

Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sandaiji et al (US 4,982,065) in view of Bjornson et al (US 6,900,889).

The teachings of Sandaiji et al have been mentioned above, but Sandaiji et al are silent concerning the use of reflective surfaces in the tank to facilitate application of the radiant energy in the electrochemical processing of the wafer. However, it was known in the optics/laser art, at the time the invention was made, to provide a reflective coating on a surface in a tank in order to facilitate the application of radiant energy (i.e., laser) in the processing of a substrate as evidenced by Bjornson et al (see col. 5, lines 48-64). In light of the conventional wisdom of the routineer in the optics/laser art as taught by Bjornson et al, it would have been within the purview of one skilled in the art to provide a reflective coating on the inner tank surface of the

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apparatus of Sandaiji et al in order to facilitate the application of radiant energy or laser energy to the wafer being processed within the tank.

Response to Arguments

Applicants' arguments filed 3/9/06 have been fully considered but they are not persuasive.

Applicants contend that Sandaiji et al fail to teach or suggest an apparatus for planarizing a wafer using an electroless plating solution. This argument is not deemed persuasive because Sandaiji et al provide an apparatus structurally equivalent to the instantly claimed invention. The apparatus of Sandaiji et al can be used for a chemical treating purpose of a workpiece depending upon the chemical fluid placed within the tank. Applicants have not positively recited a bath or supply of electroless plating solution. All that is required is a tank capable of receiving the electroless plating solution. Also, because the apparatus does not know what it will be used for, the apparatus of Sandaiji et al remains to reads on the structurally claimed invention.

Applicants contend that Sandaiji et al do not teach or suggest a backing member for controlling the planarity of the planar member. This argument is well taken because Sandaiji et al do not recognize planarization but do provide a planar member as claimed and a lens system on the backside of the planar member to control the energy or intensity thereof applied through the planar member onto the supported workpiece. As mentioned above, Sandaiji et al provide an apparatus structurally capable of planarizing a workpiece provided the desired electrochemical fluid is added to the tank and presently, the positive recitation of a specific chemical is not recited and thereby not required to be taught by Sandaiji et al.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Laura Edwards whose telephone number is (571) 272-1227. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chris Fiorilla can be reached on (571) 272-1187. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Laura Edwards
Primary Examiner
Art Unit 1734

Le
May 19, 2006